UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
DIVISION OF TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

MEMORANDUM OF INFORMATION ON THE RESULTS OF THE CONTROL OF LYGUS PLANT BUGS ON SUGAR BEETS GROWN FOR SEED

This memorandum deals briefly with the results obtained from the experimental control of Lygus plant bugs on small plots of sugar beets grown for seed during the 1942-43 season. The effect of the Lygus control program on the yield and viability of large and small seed balls is stressed, and therefore it is believed that this memorandum will be of particular interest to those concerned with the cleaning and other processing of sugar beet seed.

During 1943 five insecticides were tested in experimental plots. Eight replicate plots, each approximately 24 by 45 feet (1/42 acre), were used in each case, and the following insecticides were tested: (1) Yellow dusting sulfur (325 mesh), (2) black or "gashouse" sulfur (325 mesh), (3) pyrethrin-sulfur dust (a pyrethrum extract-impregnated dust containing 0.2 percent of pyrethrins and 50 percent of sulfur), (4) phenothioxin-sulfur dust (15 percent phenothioxin, 60 percent sulfur, 25 percent diatomaceous earth, by weight), (5) sulfur-arsenical mixture (87.5 percent sulfur and 12.5 percent of a proprietary material containing, according to the manufacturer, calcium arsenite 5.5 percent, tri-calcium arsenate 63.0 percent, total inert material 31.5 percent). Three applications were made of all insecticides except the pyrethrin-sulfur dust. Results of previous experiments had shown this insecticide to be very effective in reducing Lygus populations, and therefore plots treated with it received only two applications. In experiments of previous years four and five applications were made.

The seed[1/] from a sample area 4 rows wide and 10 feet long in the center of each plot were harvested, threshed, and cleaned, and samples were taken for germination analyses. A No. 7 "Clipper Mill" and a canvas belt draper were used in the cleaning operation, the seed being run first through the mill and then over the draper. In passing the seed through the mill as little air as possible was used to separate the trash from the seed, thus practically all seed were saved. The seed were first cleaned over an 8/64 by 3/4-inch screen, and all trash and seed going through this screen were rerun by using a 7/64 by 3/4-inch screen. Seed retained by the 8/64 by 3/4-inch screen, or seed 8/64 inch and larger, are referred to in this memorandum as "large seed," while the seed passing through the 8/64 by 3/4-inch screen, but retained by the 7/64 by 3/4-inch screen, or seed ranging in size from 7/64 to 8/64 inches, are referred to as "small seed." Yield data and results of germination analyses for the variously treated plots are given in the accompanying table. The analysis of the data in this table showed that there were no significant differences in yield attributable to the insecticide treatments, either for large or small seed; there are, however, definite

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[1/] Sugar beet seed in commercial usage refers to the seed ball, which may contain one or more true seeds. In this memorandum the common usage of referring to the seed ball as "seed" is followed unless otherwise specifically mentioned.

Yiels and viability of seed from small plots of seed beet plants treated experimentally for Lygus control; Phoenix, Ariz. 1943. (Eight replicate plots arranged in randomized block)

Treatment	Seed yield					Seed viability		
	Pounds per acre			Percent	Percent	Percent germinating seed		
	Large 1/	Small 2/	Total	large	small	Large	Small	Total
A. Yellow dusting sulfur (325 mesh)	2,434	447	2,881	84.5	15.5	85.8	58.6	81.5
B. Black (gashouse) sulfur (325 mesh)	2,311	437	2,748	84.2	15.8	83.9	58.9	79.9
C. Pyrethrin-sulfur dust	2,416	505	2,921	82.7	17.3	88.1	63.4	83.7
D. Phenothioxin-sulfur dust	2,479	415	2,894	85.6	14.4	82.9	53.3	78.6
E. Sulfur-arsenical mixture	2,114	390	2,504	84.4	15.6	81.3	56.1	76.3
F. Untreated check	2,191	403	2,594	84.5	15.5	78.4	45.8	72.3

1/ 8/64 inch and over.

2/ 7/64 to 8/64 inch.

differences due to treatment in the percentage of germinating seed produced, which is in accordance with the results of previous experiments. Two applications of the pyrethrin-sulfur dust were as good as or better than three applications of the other materials. No differences were indicated for the two types of sulfur, and the addition of phenothioxin and diatomaceous earth or arsenicals to the sulfur did not increase its effectiveness.

Yield data in the accompanying table also show that slightly more than 15 percent of the total yield were small seed which would be lost by the use of an 8/64 by 3/4-inch screen. It is generally understood that the percent of germinating seed is lower in case of small seed, and the data in the table substantiate this theory; however, these data also show that where Lygus bugs were controlled, the germination of the small seed was improved as well as the germination of the large seed, and furthermore the increase in the percentage of germinating seed due to Lygus control was greater in case of the small seed than in case of the large seed. The figures in the last column of the table represent the germinations that would have resulted if all seed had been cleaned over a 7/64 by 3/4-inch screen.

Orin A. Hills
U. S. Department of Agriculture
Route 6, Box 708
Phoenix, Ariz.

January 5, 1944